

CLAIMS

1. A process for producing a protein composition from a dairy stream which comprises the steps:

- a) subjecting the dairy stream to conditions which cause the formation of a protein concentrate and serum,
- b) separating the protein concentrate and the serum,
- c) solublising the separated protein concentrate in an aqueous solution,
- d) combining the solubilised protein concentrate with the separated serum to form the protein composition, and
- e) concentrating the protein composition formed in step d.

2. A process as claimed in claim 1, wherein the conditions in step a) comprise adjusting the pH of the dairy stream to a range of 4.5 to 4.8, followed by heating to form a protein concentrate and serum.

3. A process as claimed in claim 1, wherein the conditions in step a) comprise adding an enzyme capable of converting kappa-casein to para-kappa-casein to the dairy stream followed by heating to form a protein concentrate and serum.

4. A process as claimed in claim 1, wherein the step a) comprises dividing the dairy stream aqueous medium containing the milk protein into two portions,

adjusting the pH of one portion to a range of 4.5 to 4.8,

adding an enzyme capable of converting kappa-casein to para-kappa-casein to the other portion, and

combining the two portions and heating the combined stream to form a protein concentrate and serum.

5. A process as claimed in any one of the preceding claims, wherein the dairy stream is skim milk.

6. A process as claimed in any one of the preceding claims, wherein the dairy stream is pasteurised.

7. A process as claimed in any one of the preceding claims, wherein the dairy stream undergoes a membrane concentration step.

8. A process as claimed in claim 7, wherein the membrane concentration step is an ultrafiltration step.

9. A process as claimed in claim 2 or 4 wherein the pH of the dairy stream or of the one portion is adjusted by the addition of an acid, preferably a food approved acid, more preferably hydrochloric or sulphuric acids.

10. A process as claimed in claim 2 or 4 wherein, when the dairy stream contains lactose, the pH of the dairy stream or the one portion is adjusted by the addition of a starter culture to ferment a portion of the lactose to acid, most commonly lactic acid.

11. A process as claimed in claim 10, wherein the starter culture is any food approved bacteria culture capable of fermenting lactose to form acid.

12. A process as claimed in claim 11 wherein the bacterial culture is of a strain of the genus *lactobacillus*.

13. A process as claimed in any one of claims 2, 4 and 9 to 12, wherein the pH is adjusted to about 4.6.

14. A process as claimed in claim 3 or 4, wherein the other portion of the dairy stream is reacted with the kappa casein converting enzyme at a temperature below about 15°C, more preferably at less than 10°C.

15. A process as claimed in claim 14, wherein the kappa casein converting enzyme is chymosin.

16. A process as claimed in claim 14, wherein the kappa casein converting enzyme is rennet, preferably derived from either animal or microbial sources.

17. A process as claimed in any one of claims 2 to 16, wherein the protein concentrate and serum are formed by heating to a temperature of between about 25°C and 70°C, more preferably between 30°C and 55°C and most preferably between 40°C and 50°C.

18. A process as claimed in claim 17, wherein the heating is carried out for a holding time of from 1 to 600 seconds, preferably 5 to 200 seconds, more preferably 10 to 50 seconds.

19. A process as claimed in any one of the preceding claims, wherein the protein concentrate separated in step b) is washed with water.

20. A process as claimed in any one of the preceding claims, wherein the protein concentrate separated in step b) is milled.

21. A process as claimed in any one of the preceding claims, wherein in step c) the protein concentrate is dissolved in an alkaline solution.

22. A process as claimed in claim 21, wherein the alkaline solution contains cations including sodium, potassium, calcium, magnesium or a mixture thereof.

23. A process as claimed in any one of the preceding claims, wherein the protein levels of the serum separated in step b) are adjusted by addition, removal or modification of the proteins.

24. A process as claimed in any one of the preceding claims wherein the serum separated in step b) is concentrated before being combined with the solubilised protein concentrate in step d).

25. A process as claimed in any one of the preceding claims, wherein the serum separated in step b) is further separated into a protein rich stream and a lactose rich stream.

26. A process as claimed in claim 24 or 25 wherein in step d) the concentrated protein solution is mixed with all or part of the protein rich serum stream and all or part of the lactose rich stream to form the protein composition.

27. A process as claimed in any one of the preceding claims, wherein fat, oil or cream is added to the protein composition formed in step d).

28. A process as claimed in any one of the preceding claims, wherein the protein composition is homogenised.

29. A process as claimed in any one of the preceding claims, wherein the protein composition is dried.

30. A process as claimed in any one of the preceding claims wherein the protein composition is used in the manufacture of a cheese.

31. A protein composition prepared according to any one of claims 1 to 29.

32. A cheese manufactured using the protein composition of claim 31.

33. A milk proteinate composition containing both para-kappa-casein and whey protein, which, when concentrated, does not form a gel.

34. The milk proteinate composition of claim 33 having a calcium concentration of from 2,700 mg/kg to 15,000 mg/kg and a sodium concentration of from 11,000 mg/kg to 1,300 mg/kg, both on a dry basis.

35. The milk proteinate composition of claim 33 or 34 as a powder.

36. A cheese prepared using the proteinate composition of any one of claims 33 to 35.